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TCS-80052/65

January 1965

PHOTOGRAPHIC INTERPRETATION REPORT

EXPLOSIVES PLANT SOUTH TAI-YUAN, CHINA



CIA



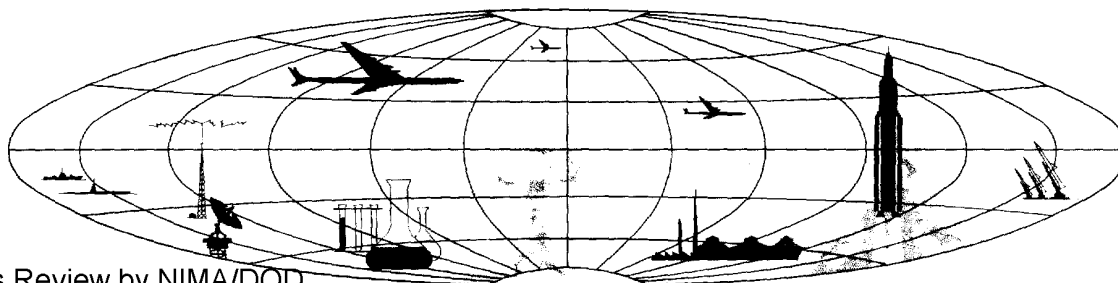
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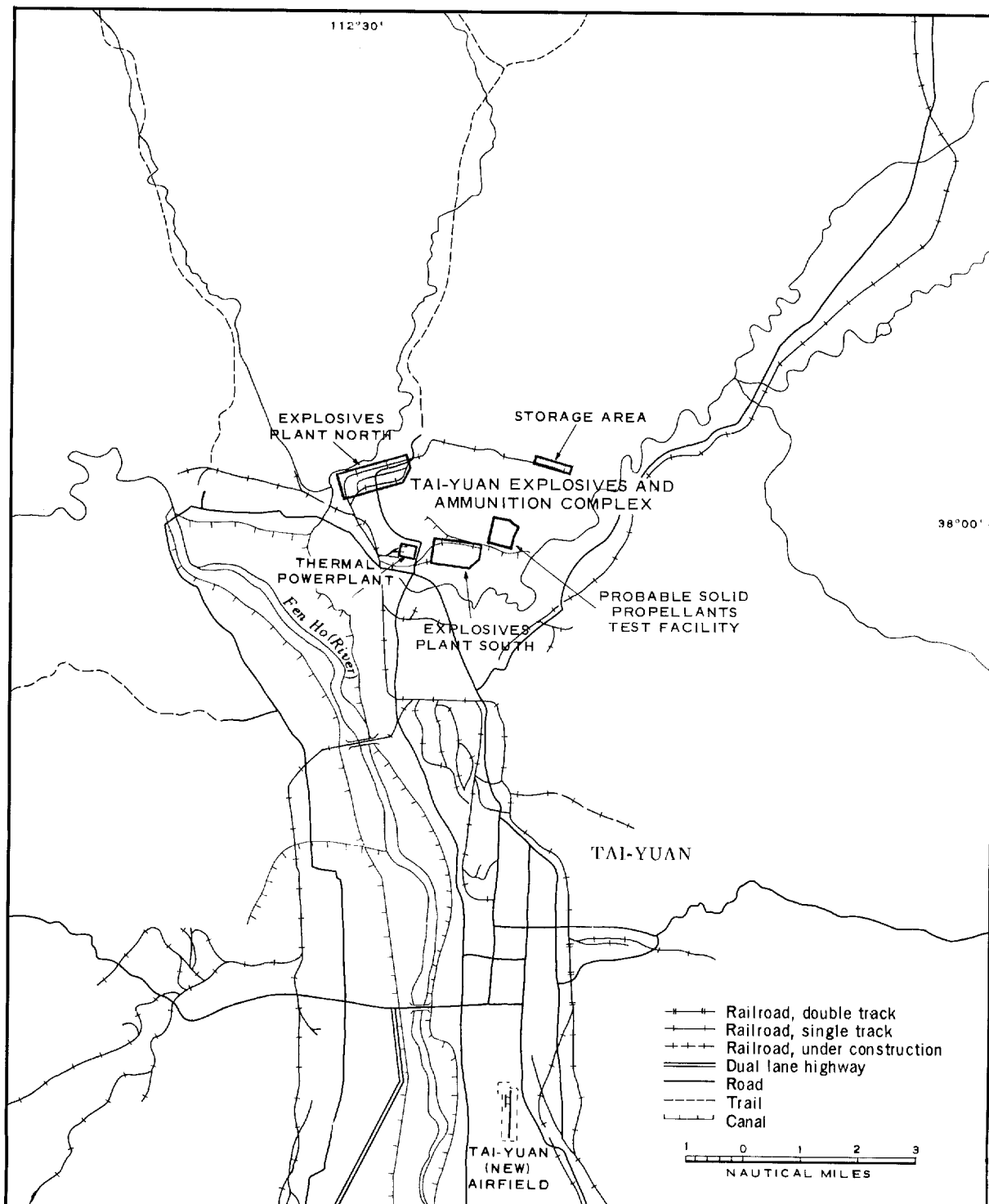


FIGURE 1. LOCATION MAP.

NPIC J-7528 (1/65)

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SUMMARY

Tai-yuan, China, has been reported to be a center of rocket research and missile manufacture. Tai-yuan Explosives Plant South has been identified as one of the installations most probably involved in such a program. This is based on the presence of the adjacent Probable Solid Propellants Test Facility and the capability of the plant to manufacture a double-base propellant.

Tai-yuan Explosives Plant South is interpreted as a Soviet-designed plant which is probably in limited production of a double-base propellant. The plant contains the following industrial facilities: one probably completed nitroglycerine line and two other such lines under construction, a nitrocellulose production section, a propellant production area, a propellant finishing section, a fabrication and packaging section, and a small woodpulp plant. A possible shell-loading facility is also adjacent to the plant.

INTRODUCTION

The Tai-yuan Explosives Plant South (BE [redacted]) is located in northeastern China at 37-29-30N 112-32-00E (Figure 1). This explosives manufacturing plant is the southernmost component of an explosives and ammunition complex located on the northern edge of the city of Tai-yuan and is also an integral part of the explosives arsenal complex of which there are several plants and facilities in the Tai-yuan area. Adjacent to the northeast corner of Explosives Plant South is a probable solid propellants test facility which was the subject of a previous photographic interpretation report. 1/

Tai-yuan has been named in at least two collateral intelligence reports as a center of rocket research and missile manufacture, under a program which received Soviet aid in the 1950s.

Although these reports are unconfirmed and cannot be completely validated by photographic interpretation, they are of interest here because they specify the general location of Explosives Plant South as the place where missile research and manufacturing has taken place and associate this activity with Soviet aid. One report states that the Chinese began their research on rockets in 1954 at an ordnance factory in Tai-yuan and later expanded their operations with Soviet support to produce short-range rockets on a trial basis. 2/ The other report indicates that guided missiles were being produced during 1959 and 1960 [redacted]

have been so identified. Photography strongly indicates that the Explosives Plant South is among those built with Soviet aid, although it is not specifically mentioned in the report. The design of this explosives plant is similar to components of known Soviet facilities, and the adjacent test facility has a number of features in common with at least five known Soviet test facilities. 1/ Another indication that it was built with Soviet aid is that construction has been at an abnormally slow rate ever since the Soviets withdrew their aid to China in 1959.

This report is based primarily on good quality photography of [redacted] and on KEYHOLE photography of [redacted]. Earlier photography of [redacted] [redacted] was of value in the preparation of this report.

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Table 1. Dimensions and Descriptions of the Principal Structures of Explosives Plant South
(Item numbers are keyed to Figure 3)

Item	Description
1	Preliminary woodpulp preparation building
2	Preliminary woodpulp preparation building
3	Warehouse
4	Warehouse
5	Pulpwood receiving and preparation warehouse
6	Probable digester and blowdown tanks
7	Possible liquor recovery building
8	Woodpulp evaporation and drying building
9	Possible cooking-liquor recovery building
10	Settling tanks, possible industrial waste
11	Possible pump station
12	Possible pulpwood nitration building
13	Possible nitric acid concentration building
14	Possible nitric acid absorber building
15	Probable settling tanks (3) (serving boiling tub house and poacher)
16	Probable boiling tub house
17	Processing building
18	Probable pulping house
19	Valve house for steam lines
20	Valve house for steam lines
21	Probable poaching and blending house
22	Acid reclamation plant
23	Miscellaneous sheds, variable size
24	Probable wringer and press house
25	Probable compressor house
26	Probable dehydration and press house
27	Utility/support building
28	Transshipping warehouse
29	Processing building
30	Processing building
31	Possible machineshop/workshop, T-shaped stem bar
32	Processing building, T-shaped stem bar
33	Processing building
34	Processing building
35	Processing building
36	Processing building
37	Mixed acid preparation house, L-shaped base leg
38	Possible glycerine storage building
39	Probable spent acid recovery building
40	Probable acid storage and pumping building
41A	Probable glycerine heater and tank houses (3), L-shaped base leg
41B	Refrigeration houses (3)
42	Nitration and separation houses (3), irregular shape, overall dimensions
43	Neutralization and storage houses (3)
44	Probable catch house
45	Probable final filtration and purification houses (2)
46	Processing building
47	Processing building
48	Processing building
49	Processing building
50	Processing building

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Table 1. (Continued)

Item	Description	
51	Processing building	
52	Processing building	
53	Processing building	
54	Processing building	
55	Nitroglycerine and nitrocellulose mixing and shaping buildings (2), irregular shape, overall dimensions	
56	Nitroglycerine and nitrocellulose mixing and shaping buildings (2), irregular shape, overall dimensions	
57	Explosives storage structures (2), underground	
58	Explosives storage structures (2), under construction	
59	Probable support/utility building	
60	Probable support/utility building	
61	Probable support/utility building	
62	Probable support/utility building	
63	Drying and finishing buildings (11)	
64	Possible rest houses (7)	
65	Possible packaging building, irregular shape, overall dimensions	
66	Barracks-type buildings (19)	
67	Unidentified structure	
68	Probable laboratory	
69	Probable laboratory	
70	Administration building or laboratory	
71	Storage buildings, variable size, small	
72	Storage/maintenance building	
73	Building under construction, footings and uprights in place	
74	Probable finishing and packaging building	
75	Warehouses (2)	
76	Probable warehouse under construction, footings in place	
77	Storage/utility building	
78	Storage/utility building	
79	Storage/utility building	
80	Storage/utility building	
81	Storage/utility building	
82	Storage/utility building, T-shaped stem bar	
83	Buildings (2) under construction, some footings in place	
84	Buildings (2) under construction	
85	Buildings (2) under construction	
86	Buildings (2) under construction	
87	Excavations	
88	Processing building	
89	Processing building	
90	Warehouse	
91	Warehouse	
92	Warehouse	
93	Probable shop	
94	Revetted storage building	
95	Revetted storage building	
96	Water treatment plant	
97	Water treatment reservoir	
98	Utility/support building, irregular shape, overall dimensions	
99	Storage buildings, variable sizes, small	
100	Warehouse with adjacent open storage	
101	Storage buildings (4)	
102	Warehouse	
103	Warehouse with high-bay section	
104	Warehouse	

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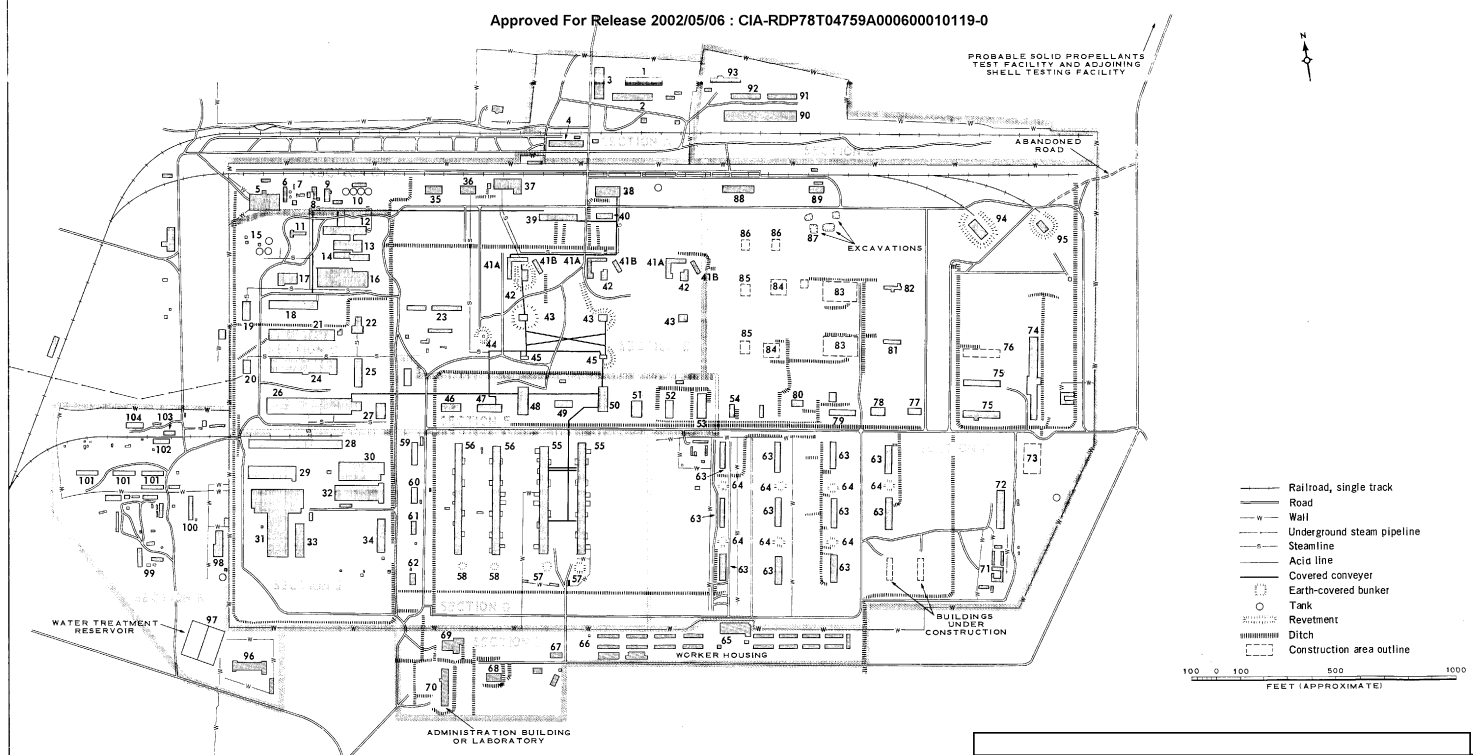
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western end of the plant.

Steam and power for Explosives Plant South are supplied by a thermal powerplant located approximately 0.2 nautical miles to the west.

SECTION A--PULPWOOD PREPARATION SECTION

This section is located in about the center of the northern side of the plant. Pulpwood used for making nitrocellulose undergoes preliminary preparation in this area. Logs stored in the open are debarked and then converted into chips which are transported to Section C for conversion to cellulose slurry.

SECTION B--STORAGE AND SUPPORT AREA

Extensive open storage and three warehouses (items 90, 91, and 92) are located in this section which is immediately east of the Pulpwood Preparation Section. The existence of a tank car unloading dock in this section is implied by the presence of tank cars observed on photography from two missions. Tank cars are probably the source of acid and glycerine used at the plant and account for the lack of an acid-producing facility.

SECTION C--WOODPULP PLANT

A probable sulfate woodpulp plant is located in this section. Wood chips from Section A are converted into woodpulp used in the production of nitrocellulose in Section D. Raw wood chips are delivered to the east end of a receiving warehouse and preparation building (item 5), moved by conveyer into the digester, and dropped into the blowdown tanks (item 6). Final processing consists of liquor recovery (items 7 and 9) and partial drying of the pulp (item 8).

SECTION D--NITROCELLULOSE MANUFACTURING SECTION

The buildings in this section are involved in the manufacture of nitrocellulose. The pulpwood

from Section C is moved to the possible pulpwood nitration/nitric acid concentration building (items 12, 13, and 14) and converted into a wet and impure nitrocellulose. It appears that the wet nitrocellulose is then moved to a dehydration and press house (item 26) via a boiling tub house (item 16) and a poaching and blending house (item 21). The nitrocellulose is probably not completely dried until it is moved to Section F by covered conveyer; this would account for the lack of external blast protection around the buildings in Section D.

SECTION E--NITROGLYCERINE PRODUCTION AREA

Three nitroglycerine lines are observed in this area, two of which are still under construction. The westernmost line is probably complete and in limited production. The three lines are illustrated on Figure 3 as three sets of structures with identical item numbers (41A through 45 in the probably complete western line). Direction of flow of the lines is from north to south, commencing with the nitrating and separation house (item 42), proceeding to the neutralization and storage house (item 43), and ending at the probable final filtration and purification house (item 45).

SECTION F--PROBABLE NITROGLYCERINE AND NITROCELLULOSE PREPARATION SECTION

Preparations for combining the nitroglycerine and nitrocellulose probably begin in this section. Identification of the individual structures in this section is not made at this time because of their unfinished condition and also because of their indeterminable relationship to the nitroglycerine lines and to other adjacent facilities to the east (items 81 through 89). The general function of the section is implied by the convergence of the conveyer system from the nitroglycerine section and the nitrocellulose areas.

SECTION G--PROPELLANT PRODUCTION SECTION

Actual combination of the nitroglycerine and nitrocellulose takes place in Section G. Only the eastern pair of mix houses (item 55) are complete enough to be capable of production. That these buildings are probably in a limited stage of production is further demonstrated by the presence of a complete conveyer system and also by the presence of an interior security wall which isolates the mix buildings from the rest of the plant. The product produced is an unfinished double-base propellant which is transported to Section II for drying and final processing.

SECTION H--PROPELLANT FINISHING SECTION

The unfinished propellant is delivered from the mixing and shaping building in Section G and held in rest houses (item 64) between the drying and finishing buildings (item 63). The three westernmost drying and finishing buildings (item 63) were the only ones operational in [REDACTED] as was indicated by the presence of an interior security wall and by evidence of traffic about these buildings. On photography of [REDACTED] there were indications that the adjacent line of three drying and finishing buildings had been put in operation.

A number of building footings and other unfinished structures are observed immediately north of the finishing and drying buildings. This area has remained essentially unchanged since the first coverage in [REDACTED] and has still not provided discernible indications as to function or product. Two heavily revetted storage buildings (items 94 and 95) located in the northeast corner of the plant are probably used for storage of the finished propellant which is shipped from the plant by rail.

SECTION I--ADMINISTRATION AND LABORATORY AREA

This area is located south of the plant just outside the security wall. A housing complex for

plant workers (item 66) is immediately east of the laboratory buildings.

SECTION J--FABRICATION AND PACKAGING SECTION

This section is involved in various types of light fabrication and plant maintenance. The location of this section adjacent to the shipping and receiving area (Section K) implies that some explosives products manufactured in this section are in their final stages of preparation in this section.

SECTION K--SHIPPING AND RECEIVING SECTION

This section serves as the shipping and receiving facility for the plant. A secured rail yard within the area contains seven warehouse and freight-handling buildings and other small structures. A water treatment plant located at the southwest corner of the plant (items 96 and 97) is in the late stages of construction.

PROBABLE SOLID PROPELLANTS TEST FACILITY

This facility with its adjoining shell-testing facility is located adjacent to the northeast corner of the plant (Figure 4). It contains the following items: a multilevel, irregularly shaped building identified as a probable test cell (item 5) with an adjoining earth blast deflector under construction; a three-level, L-shaped, major support building (item 3); a two-level, irregularly shaped building (item 2); a small revetted, L-shaped building (item 8); nine probably single-story buildings, and several very small structures. Dimensions of the principal buildings are given in the table inset on Figure 4. The shell-testing facility consists of [REDACTED] two firing emplacements, an open range, and a revetted storage building.

CHRONOLOGY

The first photographic coverage of Taiyuan Explosives Plant South was obtained in

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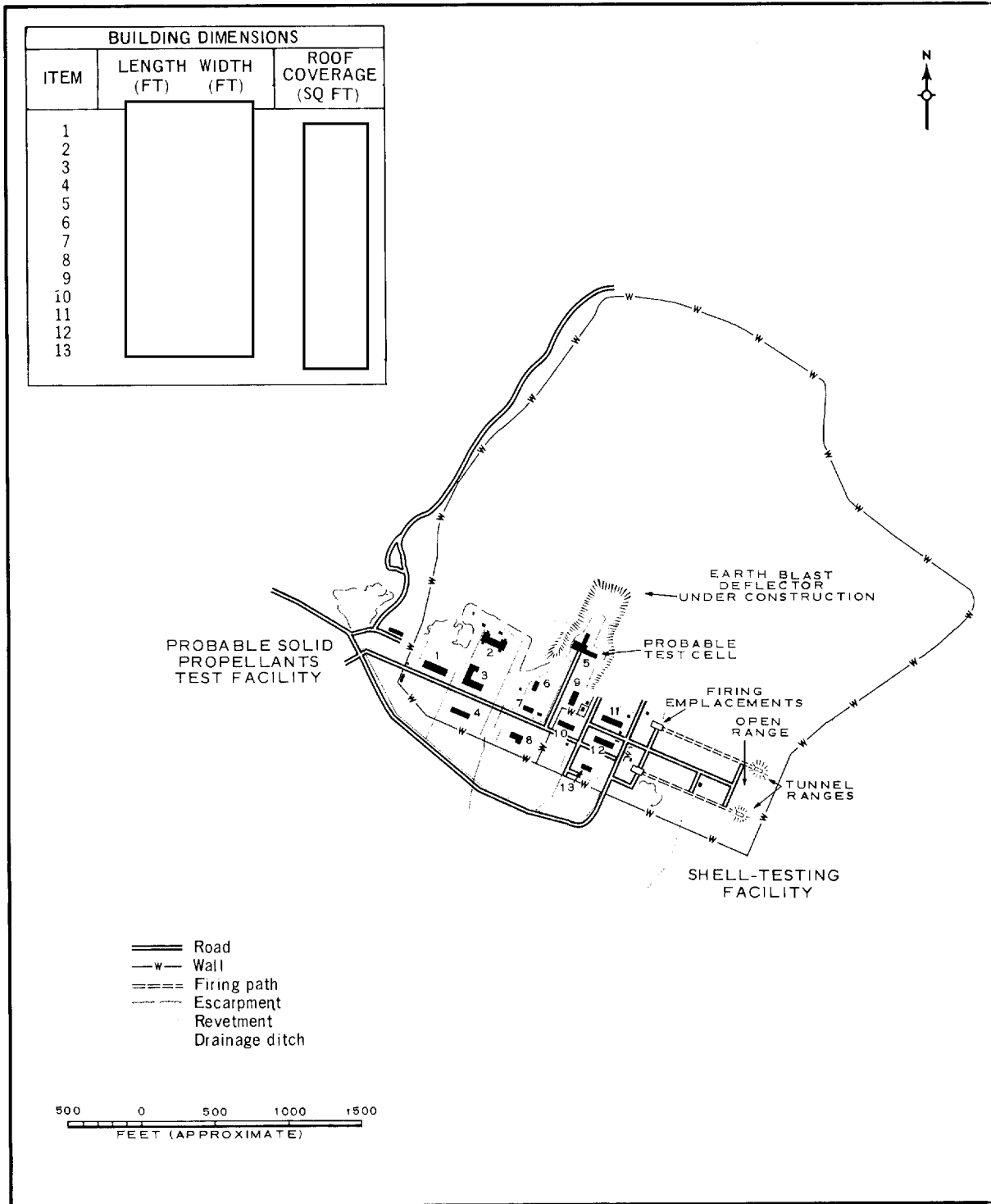


FIGURE 4. LAYOUT OF PROBABLE SOLID PROPELLANTS TEST FACILITY AND ADJOINING SHELL-TESTING FACILITY.

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25X1D [] At that time the plant was in the
midstage of construction with all major build-
ings started. The next good coverage was ob-
tained in [] by which time all major pro-
duction buildings and most of the overhead pipe-
lines and conveyer systems were partially com-
plete, although earth revetting for blast protec-
tion had not yet been started. Photography of
25X1D [] revealed further construction of
overhead pipelines and conveyers and partial
construction of earth revetments on the nitro-
glycerine lines. Two revetted storage buildings
(items 94 and 95) were constructed between []
25X1D [] The latest coverage
25X1D is of [] which reveals a continued
slow pace of construction. A rail spur had been
built to serve each of the revetted storage build-
ings (items 94 and 95); three more drying and
finishing buildings (item 63) had been completed
and were possibly in operation; two structures
under construction with footings and some walls
in place were seen for the first time in the south-

east corner of Section II. No major changes were
evident on the [] photography in the
nitroglycerine or nitrocellulose sections.

CONCLUSIONS

Tai-yuan Explosives Plant South is inter-
preted as a Soviet-designed plant probably in
limited production of a double-base propellant
containing nitroglycerine and nitrocellulose.
This type of propellant is used in artillery,
small arms, and mortar shells, and it is also
used in small rockets and propulsion units. The
presence of the previously reported probable
solid propellants test facility and the presence
of a possible shell-loading facility to the north-
west of the plant may indicate that the propellant
will be utilized for both purposes. 4/ Further,
collateral information indicates a possible link
between Tai-yuan Explosives Plant South and a
Soviet-supported Chinese missile program in
Tai-yuan.

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REFERENCES



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MAPS OR CHARTS

ACIC. US Air Target Chart, Series 200, Sheet.0382-13AL, 2d ed, Oct 60 (SECRET)

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2. CIA. CS-3/400,844, *Chinese Nationalist Official Reports on Chinese Communist Preparations to Launch an Artificial Satellite*, 3 Jun 59 (CONFIDENTIAL/Noform/CONTINUED CONTROL)
3. BSSO. OIR No 0315/62, *China (Shansi) - P Armaments*, 15 Jun 62 (SECRET)
4. NPIC. R-1611/64, *Explosives Plant North, Tai-guan, China*, Nov 64 (SECRET/No Foreign Dissem)

REQUIREMENT

CIA. C-RR4-81,679

NPIC PROJECT

N-863/64 (partial answer)

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